

**REMARKS**

The Amendment, filed in response to the Office Action mailed April 3, 2009, is believed to fully address all issues raised in the Action. A favorable reconsideration on the merits and allowance of the application are respectfully requested.

***Claims Disposition***

Upon entry of the current amendment, which is respectfully requested, claims 1, 4-6, 13-16, 19-21, and 29-37 are all the claims pending in the application. Claims 2-3, 7-12, 17-18, and 23-28 are canceled without prejudice or disclaimer. Claim 1 is amended to more clearly set forth the claimed subject matter by incorporating the “titanium dioxide being doped with one or more selected from a group consisting of vanadium (V), molybdenum (Mo) and niobium (Nb)” feature of canceled claim 8. Claim 1 is further amended to remove the phrase “anion charges of 500 meg(milliequivalent) or more” of 20-60 wt.%. Claims 1 and 16 are additionally amended to more clearly set forth the claimed subject matter by incorporating feature of the biodegradable film “made of one or more selected from the group consisting of polybutylene succinate, polyethylene succinate, ester starch and cellulose acetate of cancelled claim 2. Claims 1 and 16 are further amended to remove the phrase “titanium dioxide for sterilizing and deodorizing in which an anatase content is 70% or more” of 0.1-2.0 wt%; and “sodium benzoate,” respectively. Claims 1 and 14 further add the feature “based on the total amount of the composition” for purposes of clarification.

Claim 13 is amended to more clearly set forth the claimed subject matter by incorporating the “releasing agent of 0.5-5 wt%” feature previously set forth in claim 1. Claim 29 is amended to include the “releasing agent” feature previously set forth in claim 1 and the “(S1)” step set forth in claim 16.

Claims 32-37 are newly added. Claims 32-37 have support in previously presented claim 1 and cancelled claim 2. The feature "titanium dioxide for sterilizing and deodorizing in which an anatase content is 70% or more of 0.5-2.0 wt%" of claims 32, 34, and 36 is supported by the disclosure of Examples 2-4, 9-16 and of the second full paragraph below Table on page 13. Claim 27 has support in claim 16. Claims 4-6, 13-15, 19-22 and 29-31 are amended to add dependency.

No new matter is introduced.

***Formal Matters***

Applicants thank the Examiner for considering the references listed in the January 13, 2009 and February 5, 2009 IDS and SB/08 Forms.

***Response to Provisional Obviousness-type Double Patenting Rejection***

In the Office Action, claims 1, 2, 4-6, 8, and 13-16 are provisionally rejected on the ground of nonstatutory obviousness type double patenting as being unpatentable over claims 1-4, 6, and 11-14 of copending Application No. 11/579,619 in view of Bastioli et al. (US 5,512,378).

Applicants respectfully request the rejection be withdrawn, as the instant application has an earlier filing date than the copending Application No. 11/579,619 (November 6, 2006) and the instant application is believed to be in the condition for allowability otherwise.

At least, Applicants respectfully request the rejection be held abeyance until the patentable subject matter is determined.

***Response to Rejection under 35 U.S.C. § 112***

In the Office Action, claim 8 is rejected as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8 is cancelled rendering the rejection moot, thus Applicants request removal of this rejection.

***Response to Rejection under 35 U.S.C. § 103(a)***

In the Action, claims 1, 2, 4-6, 8, 14-17, 19-22, 24, 30, and 31 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Bastioli et al.(US 5,512,378) in view of George et al. (US 5,393,804), Sanbayashi et al. (US 2002/0160910), Matsuda et al. (6,183,596), Levey et al. (US 2,137,169), and Kuroda et al. (US 5,786,406).

At pages 4-11 of the Action, the Office provides detailed analysis and discussion of the above references, which are not repeated herein.

Applicants respectfully traverse.

Claim 1 is amended by incorporating the invention of claim 8 that the composition contains titanium dioxide in an amount of 0.1-2.0 wt% based on the total amount of the composition and the titanium dioxide is doped with at least one selected from the group consisting of vanadium(V), molybdenum(Mo), niobium(Nb). Claim 1 is further amended by incorporating the invention of claim 2 that the composition contains a biodegradable film made of one or more selected from the group consisting of polybutylene succinate, polyethylene succinate, ester starch and cellulose acetate.

**Claimed invention**

The presently claimed invention relates to a biodegradable starch bowl in claims 1, 32, 33 and 34, and a method for preparing a biodegradable starch bowl in claims 16, 35, 36 and 37. The starch bowl has an improved compressive strength, a stench, a prevention of the color change, a sterilizing and deodorizing effect, and a preservative property by comprising "certain

components" as an additive material to starch, pulp fiber powder and solvent in a "certain amount." See Tables 10-11 and paragraphs [0111] and [0112] of the present specification.

**Regarding a biodegradable film**

The Office asserts that Bastioli teaches a biodegradable article comprised of a starched base material and a biodegradable film thereon, which comprises up to 90% polyvinyl alcohol or a polycaprolactone. Paragraphs 8 and 10 of the Office Action.

However, Bastioli et al (US 5512378) does not disclose a water-resistant film, made of one or more selected from a group consisting of polybutylene succinate, polyethylene succinate, ester starch and cellulose acetate as is recited in the currently amended claims.

**Sanbayashi et al. (US 2002/0160910)**

The Office asserts that the present invention is unpatentable over Sanbayashi et al.(US 2002/0160910) which is applied further to Bastioli, and the titanium dioxide where the anatase content is 70% or more is obvious to a person skilled in the art to perform the intended use, i.e., sterilizing and deodorizing.

In particular, with regard to original claims 8 and 24, the Office asserts that Sanbayashi teaches that the titanium dioxide is doped with platinum. Paragraph 17 of Office Action. However, Sanbayashi does not disclose "titanium dioxide doped with one or more selected from a group consisting of vanadium (V), molybdenum (Mo) and niobium (Nb) as recited in the currently amended claims. In addition, Sanbayashi does not disclose titanium dioxide in which anatase content is 70% or more of 0.5-2.0 wt%.

**Regarding titanium dioxide in which anatase content is 70% or more**

Although Sanbayashi fails to teach or provide motivation to modify its teachings to reach the claimed subject matter, in particular with respect to the element "titanium dioxide in which

anatase content is 70% or more," the Office maintains that the titanium dioxide structure of Sanbayashi is capable of performing the intended use of the present invention. See pages 6-7, paragraph 16 of the Action.

However, the composition for a starch bowl as defined in currently presented claims 16, 32, 34, and 36 exhibits "100%" of sterilizing and deodorizing effects when 70% or more of anatase titanium dioxide is included, and titanium dioxide having crystal structures (e.g. rutile) other than 70% or more of anatase exhibits "0%" of sterilizing and deodorizing effects. See paragraph [0112], Comparative Examples 17 to 28, and Tables 10 and 11 of the present specification. That is, when titanium dioxide having the specific crystal structure of "70% or more of anatase," which means that 70% of titanium dioxide has anatase crystal structure and almost 30% of titanium dioxide has rutile crystal structure with a minimum of titanium dioxide as brookite crystal structure (see paragraph [0057] of the present specification) is included, the starch bowl can exhibit remarkable sterilizing and deodorizing effect.

Conversely, Sanbayashi includes a photo-functional particle comprising "titanium dioxide and a condensed phosphate which contains an alkaline earth metal" for their intended use, which has a different composition from that of the composition defined in claims of the instant application.

In addition, the crystal structure of titanium dioxide, which is utilized for their intended use in Sanbayashi is "brookite-type crystal" (see paragraph [0067] of Example 1 to paragraph [0090] of Example 7 of Sanbayashi), which is different from titanium dioxide in which anatase content is 70% or more. Therefore, when referring to the present specification as described above, the other crystal structures of titanium dioxide other than 70% or more of anatase of the

present invention, cannot perform an intended sterilizing and deodorizing use for the starch bowl.

Therefore, titanium dioxide in which anatase content is 70% or more as recited in the claims of the instant application, which has a different composition and crystal structure from the photo-functional particle disclosed in Sanbayashi, results in distinctive intended use and exhibits unexpected results over the disclosure of Sanbayashi.

Regarding the amount 0.5-2.0 wt% of titanium dioxide in which an anatase content is 70% or more

The Office asserts that Sanbayashi teaches that titanium dioxide is present in 0.01-80% of the entire composition. See page 7, paragraph 16 of the Action. When referring to [0035] of Sanbayashi, however, total amount of titanium dioxide and condensed phosphate containing an alkaline earth metal included in the photo-functional powder is 0.01 to 80 mass%. That is, the amount of "titanium dioxide" is not specifically disclosed in Sanbayashi, and Sanbayashi does not indicate the amount of titanium dioxide is a result-effective variable.

Conversely, the composition defined claim 32, 34, and 36 of the present application comprises 0.5-2.0 wt% of titanium dioxide which has an anatase in the content of 70% or more. In the range of 0.5-2.0 wt%, the composition exhibits a remarkable sterilizing and deodorizing effects (100%). When titanium dioxide is used outside of this range (for example, 0.2 wt% of titanium dioxide of which anatase content is 70% or more; Example 1 of the present specification), Applicants identify that sterilizing and deodorizing effects are reduced (sterilizing effect is reduced to 65%, deodorizing effect is reduced to 70%), even though titanium dioxide in which anatase content is 70% or more is used. See paragraph [0111], Examples 1-4, Table 10 of

the present specification. Further, when adding too much titanium dioxide, the molding property and the strength of the bowl may be lowered. See paragraph [0058] of the present specification.

Therefore, the claimed composition shows not only the sterilizing and deodorizing effects, but also the compressive strength and the ability to satisfy the characteristic feature required in a composition for a biodegradable starch bowl comprising titanium dioxide of which the anatase content is 70% or more is contained.

**Levey et al. (US 2,137,169)**

The Office asserts that Levey teaches the use of 1/30<sup>th</sup>-4% of an antimycotic preservative present in starch products, and discloses sodium benzoate as one such preservative.

Applicants respectfully disagree. Levey discloses neither sodium benzoate of more than 0.2 or equal to less than 0.5 wt% nor does Levey disclose sodium propionate in the amount of 0.01-1 wt% as recited in the currently amended claims.

Levey discloses different amounts of preservatives added corresponding to the kind of preservatives. For example, when borax is used, an amount equal to 4% of the weight of the dry starch gives satisfactory results, and when sodium-orthophenylphenate is used, an amount equal to 1% of the weight of the dry starch gives satisfactory results. See Levey, page 4, 1<sup>st</sup> column, lines 45-50. However, Levey does not disclose the amount of sodium benzoate or teaches it as a result-effective variable.

In the claimed composition, the amount of sodium benzoate plays an important role. For example, when the preservative is added in an excessive amount of 0.5 wt. % or more, there occurs nasty stench and the color of the molded body changes. See paragraph [0116] of the present specification.

Further, when referring to Comparative Examples 22 to 24 and Table 11 of the present specification, Applicants note that the composition comprising 0.2 or equal to less than 0.5 wt% of sodium benzoate shows desired preservative feature. If the composition comprising less than 0.2 wt% of sodium benzoate, for example 0.1 wt% (see Comparative Example 22, Table 11 of the present specification), the preservative property of the starch bowl is not that remarkable. Also, if the composition comprising more than 0.5 wt% or equal, for example 0.5 wt%, there occurs nasty stench and the color of the molded body becomes changed (see Comparative Example 24, Table 11 of the present specification).

For the reasons discussed above, it is believed that the rejections are not sustainable and Applicants respectfully request the rejections be withdrawn.



**CONCLUSION**

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number **202-775-7588**.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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**23373**

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